WHAT IS CLAIMED IS:

1. A carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein

i) the empirical parameter R, as determined by x-ray diffraction and defined as the height of the centre of the {002} peak divided by the background level, is less than about 2.2;

ii) the H/C atomic ratio is less than about 0.1; and

iii) the accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity;

and alkali metal atoms inserted into the carbonaceous host.

2. A carbonaceous insertion compound as claimed in claim 1 wherein the alkali metal is lithium.

3. A carbonaceous insertion compound as claimed in claim 1 wherein the accessible surface area is sufficiently small such that the irreversible capacity is less than about a third that of the reversible capacity.

4. A carbonaceous insertion compound as claimed in claim 1 wherein the methylene blue absorption capacity of the carbonaceous host is less than about 4 micromoles per gram of host;

5. A carbonaceous insertion compound as claimed in claim 1 wherein the surface area of the carbonaceous host as determined by BET is less than about 300 m^2/gram.

6. A carbonaceous insertion compound as claimed in claim 1 wherein less than about 5% by weight of the carbonaceous host is lost after pyrolyzing at about 1000°C under inert gas.

7. A carbonaceous insertion compound as claimed in claim 1 wherein the non-aqueous electrolyte comprises ethylene carbonate and diethyl carbonate.

8. A carbonaceous insertion compound as claimed in claim 1 wherein R is less than about 2.

9. A carbonaceous insertion compound as claimed in claim 1 wherein R is less than about 1.5.

10. A carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing an epoxy precursor, a phenolic resin precursor, a carbohydrate precursor or a carbohydrate containing precursor at a temperature above 700°C wherein the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2; and

alkali metal atoms inserted into the carbonaceous host.

11. A carbonaceous insertion compound as claimed in claim 10 wherein the H/C atomic ratio of the pre-graphitic carbonaceous host is less than about 0.1.

12. A carbonaceous insertion compound as claimed in claim 10 wherein the methylene blue absorption capacity of the

carbonaceous host is less than about 4 micromoles per gram of host;

13. A carbonaceous insertion compound as claimed in claim 10 wherein the surface area of the carbonaceous host as determined by BET is less than about 300 m^2/gram.

14. A carbonaceous insertion compound as claimed in claim 10 wherein the alkali metal is lithium.

15. A carbonaceous insertion compound as claimed in claim 14 wherein the pre-graphitic carbonaceous host has a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte.

16. A carbonaceous insertion compound as claimed in claim 15 wherein the accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity.

17. A carbonaceous insertion compound as claimed in claim 10 wherein the pre-graphitic carbonaceous host is prepared by pyrolyzing an epoxy precursor comprising an epoxy novolac resin.

18. A carbonaceous insertion compound as claimed in claim 17 wherein the epoxy precursor comprises a hardener in a range from zero to about 40% by weight.

19. A carbonaceous insertion compound as claimed in claim 18 wherein the hardener is phthallic anhydride.

21. A carbonaceous insertion compound as claimed in claim 19 wherein the epoxy precursor is cured at about 120°C before pyrolysis.

22. A carbonaceous insertion compound as claimed in claim 17 wherein the pyrolysis temperature is attained by ramping at from about 1°C/min to about 20°C/min.

23. A carbonaceous insertion compound as claimed in claim 10 wherein the pre-graphitic carbonaceous host is prepared by pyrolyzing an epoxy precursor comprising a bisphenol A epoxy resin.

24. A carbonaceous insertion compound as claimed in claim 23 wherein the pyrolysis temperature is attained by ramping at about 30°C/min.

25. A carbonaceous insertion compound as claimed in claim 10 wherein the pre-graphitic carbonaceous host is prepared by pyrolyzing a phenolic resin precursor at a temperature above 800°C.

26. A carbonaceous insertion compound as claimed in claim 25 wherein R is less than about 1.6.

27. A carbonaceous insertion compound as claimed in claim 25 wherein the phenolic resin precursor is cured at about 150°C before pyrolysis.

28. A carbonaceous insertion compound as claimed in claim 25 wherein the pyrolysis temperature is maintained for about an hour.

29. A carbonaceous insertion compound as claimed in claim 25 wherein the phenolic resin precursor is of the novolac type.

30. A carbonaceous insertion compound as claimed in claim 25 wherein the phenolic resin precursor is of the resole type.

31. A carbonaceous insertion compound as claimed in claim 30 wherein the phenolic resin precursor is pyrolyzed at a temperature in the range from about 900°C to about 1100°C.

32. A carbonaceous insertion compound as claimed in claim 10 wherein the pre-graphitic carbonaceous host is prepared by pyrolyzing a carbohydrate or carbohydrate containing precursor at a temperature above 800°C.

33. A carbonaceous insertion compound as claimed in claim 32 wherein the tap density of the carbonaceous host is greater than about 0.7 g/ml.

34. A carbonaceous insertion compound as claimed in claim 32 wherein R is less than about 2.

35. A carbonaceous insertion compound as claimed in claim 32 wherein the carbohydrate precursor is pyrolyzed at a temperature in the range from about 900°C to about 1100°C.

36. A carbonaceous insertion compound as claimed in claim 35 wherein the pyrolysis temperature is maintained for about an hour.

37. A carbonaceous insertion compound as claimed in claim 35 wherein the pyrolysis temperature is attained by ramping at a rate of about 25°C per minute.

38. A carbonaceous insertion compound as claimed in claim 32 wherein the carbohydrate precursor is a sugar.

39. A carbonaceous insertion compound as claimed in claim 38 wherein the sugar is sucrose.

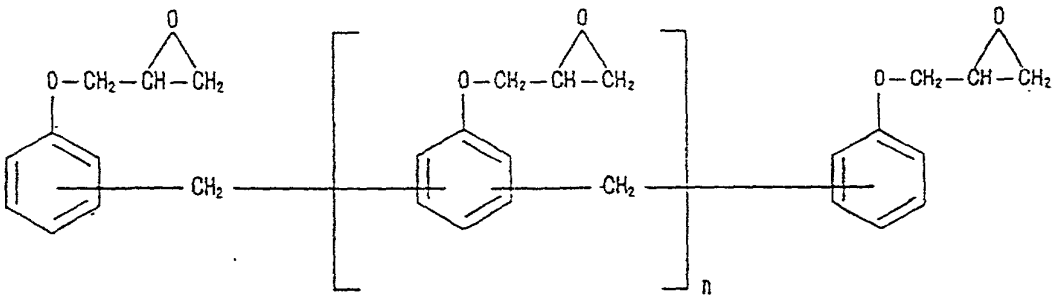
40. A carbonaceous insertion compound as claimed in claim 32 wherein the carbohydrate precursor is a starch.

41. A carbonaceous insertion compound as claimed in claim 32 wherein the carbohydrate precursor is a cellulose.

42. A carbonaceous insertion compound as claimed in claim 41 wherein the cellulose is selected from the cellulose containing group consisting of red oak, maple, walnut shell, filbert shell, almond shell, cotton or straw.

43. A carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing an epoxy novolac resin having the formula



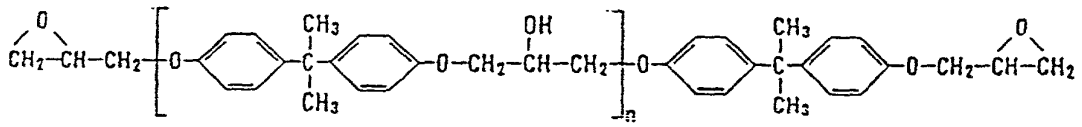
Epoxy Novolac Resin n = 1.6

at a temperature above about 700°C and below about 1100°C; and

lithium atoms inserted into the carbonaceous host.

44. A carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing a bisphenol A epoxy resin having the formula



Bisphenol-A Epoxy Resin

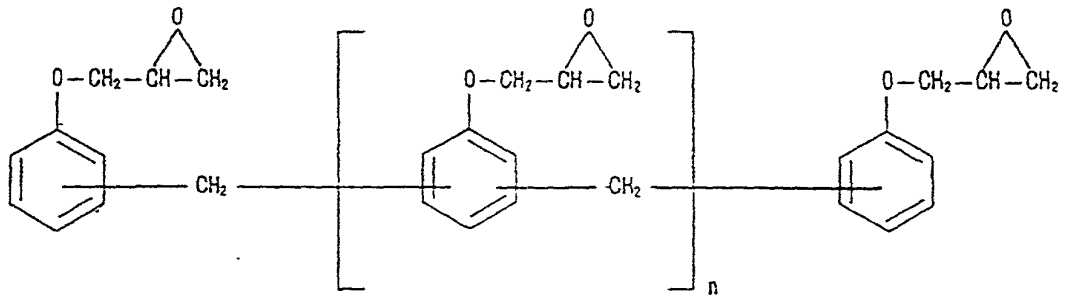
n = 12

at a temperature about 800°C, and lithium atoms inserted into the carbonaceous host.

45. A process for preparing a pre-graphitic carbonaceous host for a carbonaceous insertion compound comprising pyrolyzing an epoxy precursor at a temperature above 700°C or a phenolic resin precursor at a temperature above 800°C, or a carbohydrate precursor or a carbohydrate containing precursor at a temperature above 800°C, such that the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2.

46. A process for preparing a pre-graphitic carbonaceous host for a carbonaceous insertion compound comprising pyrolyzing an epoxy precursor at a temperature above 700°C such that the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2.

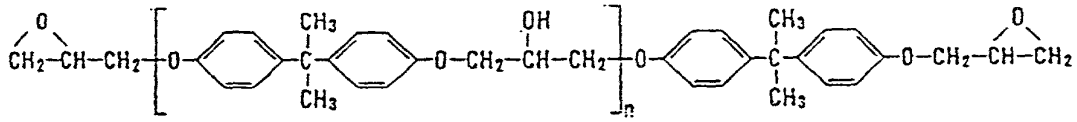
47. A process as claimed in claim 46 wherein the epoxy precursor is an epoxy novolac resin with formula



Epoxy Novolac Resin n = 1.6

and the pyrolysis is performed at a maximum temperature below about 1100°C.

48. A process as claimed in claim 46 wherein the epoxy precursor is a bisphenol A epoxy resin with formula



Bisphenol-A Epoxy Resin

n = 12

and the pyrolysis is performed at a temperature about 800°C.

49. A process for preparing a pre-graphitic carbonaceous host for a carbonaceous insertion compound comprising pyrolyzing a phenolic resin precursor at a temperature above 800°C such that the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2.

50. A process as claimed in claim 49 wherein the phenolic resin precursor is of the novolac type.

51. A process as claimed in claim 49 wherein the phenolic resin precursor is of the resole type.

52. A process as claimed in claim 51 wherein the pyrolysis is performed at a temperature in the range from about 900°C to about 1100°C.

53. A process for preparing a pre-graphitic carbonaceous host for a carbonaceous insertion compound comprising pyrolyzing a carbohydrate precursor or a carbohydrate containing precursor at a temperature above 800°C such that the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2.

54. A process as claimed in claim 53 wherein the carbohydrate precursor is selected from the group consisting of sugar, starch, and cellulose.

55. A process as claimed in claim 53 additionally comprising precarbonizing the carbohydrate by washing with an acid.

56. A process as claimed in claim 55 wherein the carbohydrate is sucrose.

57. A process as claimed in claim 55 wherein the acid is concentrated sulfuric acid.

58. An electrochemical device comprising an electrode wherein a portion of the electrode comprises the carbonaceous insertion compound as claimed in claim 1, 2, 10, 17, 23, 25, or 32.

59. A battery comprising an electrode wherein a portion of the electrode comprises the carbonaceous insertion compound as claimed in claim 1, 2, 10, 17, 23, 25, or 32.

60. A non-aqueous battery comprising:

a cathode comprising a lithium insertion compound;

a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and

an anode comprising the carbonaceous insertion compound as claimed in claim 1, 10, 17, 23, 25, or 32 wherein the alkali metal is Li.

61. The use of a carbonaceous insertion compound in an electrode of an electrochemical device, said carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing an epoxy precursor at a temperature above 700°C, or a phenolic resin precursor at a temperature above 800°C, or a carbohydrate precursor, or a carbohydrate containing precursor, at a temperature above 800°C, wherein the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2; and

atoms of an alkali metal inserted into the carbonaceous host.

62. The use of a carbonaceous insertion compound in an electrode of an electrochemical device, said carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing an epoxy precursor at a temperature above 700°C wherein the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2; and

atoms of an alkali metal inserted into the carbonaceous host.

63. The use of the carbonaceous insertion compound as claimed in claim 62 wherein the epoxy precursor is a novolac epoxy resin.

64. The use of the carbonaceous insertion compound as claimed in claim 62 wherein the epoxy precursor is a bisphenol A epoxy resin.

65. The use of a carbonaceous insertion compound in an electrode of an electrochemical device, said carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing a phenolic resin precursor at a temperature above 800°C wherein the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2; and

atoms of an alkali metal inserted into the carbonaceous host.

66. The use of the carbonaceous insertion compound as claimed in claim 65 wherein the phenolic resin precursor is of the novolac type.

67. The use of the carbonaceous insertion compound as claimed in claim 65 wherein the phenolic resin precursor is of the resole type.

68. The use of a carbonaceous insertion compound in an electrode of an electrochemical device, said carbonaceous insertion compound comprising:

a pre-graphitic carbonaceous host prepared by pyrolyzing a carbohydrate precursor, or a carbohydrate containing precursor, at a temperature above 800°C wherein the empirical parameter R, determined from an x-ray diffraction pattern and defined as the {002} peak height divided by the background level, is less than about 2.2; and

atoms of an alkali metal inserted into the carbonaceous host.

69. The use of the carbonaceous insertion compound as claimed in claim 68 wherein the carbohydrate precursor is

selected from the group consisting of sugar, starch, and cellulose.

70. The use of the carbonaceous insertion compound as claimed in claim 62, 65 or 68 wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.